

1 WHAT IS CLAIMED IS:

2

3 1. An antioxidant system comprising:

4

5 a. sulfurized isobutylene and

6

7 b. one or more hindered phenols.

8

9 2. An antioxidant system of Claim 1 wherein the hindered phenols  
10 comprise BHT and 3,5-di-t-butyl 4-hydroxy phenol propionate.

11

12 3. An antioxidant system of Claim 1 wherein the hindered phenols  
13 comprise BHT.

14

15 4. An antioxidant system of Claim 1 wherein one or more hindered  
16 phenols have the general formula:

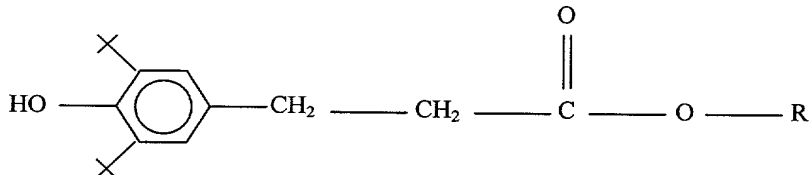
17

18

19

20

21



22

23

24

25 6. An antioxidant system of Claim 1 wherein the one or more hindered  
26 phenols comprise 3,5-di-t-butyl 4-hydroxy phenol propionate.

27

28 7. Lubricating oil comprising a base oil and the antioxidant system of  
29 Claim 1.

30

31 8. Lubricating oil comprising a base oil and the antioxidant system of  
32 Claim 2.

33

- 1 9. Lubricating oil comprising a base oil and the antioxidant system of  
2 Claim 3.  
3
- 4 10. Lubricating oil comprising a base oil and the antioxidant system of  
5 Claim 4.  
6
- 7 11. A method of lubricating engines comprising contacting the lubricating  
8 oil of Claim 7 with one or more engines.  
9
- 10 12. A method for making a lubricating oil comprising combining the  
11 antioxidant system of Claim 6 with base oil in any order.  
12
- 13 13. A method of lubricating engines comprising lubricating one or more  
14 engines with the lubricating oil of Claim 8.  
15
- 16 14. A method of lubricating engines comprising contacting one or more  
17 engines with the lubricating oil of Claim 9.  
18
- 19 15. A method of lubricating engines comprising contacting one or more  
20 engines with lubricating oil of Claim 10.  
21
- 22 16. A method of Claim 15 wherein the engine is a natural gas fueled  
23 engine.  
24
- 25 17. Lubricating oil comprising:  
26  
27 about 1 wt. % to about 8 wt. % of one or more dispersants;  
28  
29 about 1 wt. % to about 8.5 wt. % of one or more detergents;  
30  
31 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors;  
32  
33 about 0.01 wt. % to about 0.5 wt. % sulfurized isobutylene;

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33

about 0.1 wt. % to about 3 wt. % butylated hydroxy toluene;  
and about 0.1 wt. % to about 3 wt. % 3,5-di-t-butyl 4-hydroxy phenol  
propionate.

18. A method of lubricating engines comprising lubricating one or more  
engines with the lubricating oil of Claim 17.

19. A method of making the lubricating oil of Claim 17 comprising  
combining;

about 1 wt. % to about 8 wt. % of one or more dispersants;

about 1 wt. % to about 8.5 wt. % of one or more detergents;

about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors;

about 0.01 wt. % to about 0.5 wt. % sulfurized isobutylene;

about 0.1 wt. % to about 3 wt. % butylated hydroxy toluene; and

about 0.1 wt. % to about 3 wt. % 3,5-di-t-butyl 4-hydroxy phenol  
propionate in any order.

20. Lubricating oil comprising:

a major amount of one or more base oils;

about 1.25 wt. % to about 6 wt. % of one or more dispersants;

about 2 wt. % to about 6 wt. % of one or more detergents;

1           about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors;  
2  
3           about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene;  
4  
5           about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene; and  
6  
7           about 0.20 wt. % to about 2.5 wt. % 3,5-di-t-butyl 4-hydroxy phenol  
8           propionate.  
9

10   21.   A method of lubricating engines comprising contacting one or more  
11           engines with the lubricating oil of Claim 20.  
12

13   22.   A method of making the lubricating oil of Claim 20 comprising  
14           combining:

15           a major amount of one or more base oils;  
16

17           about 1.25 wt. % to about 6 wt. % of one or more dispersants;  
18

19           about 2 wt. % to about 6 wt. % of one or more detergents;  
20

21           about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors;  
22

23           about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene;  
24

25           about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene; and  
26

27           about 0.20 wt. % to about 2.5 wt. % 3,5-di-t-butyl 4-hydroxy phenol  
28           propionate in any order.  
29

30   23.   Lubricating oil comprising:  
31

32           a major amount of one or more base oils;  
33

1 about 1.25 wt. % to about 6.00 wt. % of one or more dispersants;  
2  
3 about 2 wt. % to about 6 wt. % of one or more detergents;  
4  
5 about 0.30 wt. % to about 0.80 wt. % of one or more wear inhibitors;  
6  
7 about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene,  
8  
9 about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene;  
10  
11 and about 0.20 wt. % to about 2.50 wt. % 3,5-di-t-butyl 4-hydroxy  
12 phenol propionate.  
13  
14 24. A method of lubricating engines comprising contacting one or more  
15 engines with the lubricating oil of Claim 23.  
16  
17 25. Lubricating oil for use in engines comprising sulfurized isobutylene.  
18  
19 26. Method of lubricating natural gas engines comprising contacting the  
20 lubricating oil of Claim 25 with one or more natural gas engines.  
21  
22 27. Lubricating oil comprising:  
23  
24 about 0.02 wt. % to about 2 wt. % sulfurized isobutylene;  
25  
26 about 1 wt. % to about 8 wt. % of one or more dispersants;  
27  
28 about 1 wt. % to about 8.5 wt. % of one or more of phenates,  
29 salycilates and sulfonates;  
30  
31 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors; and  
32 one or more of Group I, II, III and IV base oil.  
33

- 1 28. A method of making the lubricating oil of Claim 27 comprising blending  
2 about 0.02 wt. % to about 2 wt. % sulfurized isobutylene;  
3  
4 about 1 wt. % to about 8 wt. % of one or more dispersants;  
5  
6 about 1 wt. % to about 8.5 wt. % of one or more of phenates,  
7 salycilates and sulfonates;  
8  
9 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors; and  
10  
11 one or more of Group I, II, III and IV base oil in any order with agitation  
12 and at a temperature sufficient to blend the components but not high  
13 enough to degrade the components.  
14
- 15 29. A method of lubricating an engine comprising lubricating the engine  
16 with the lubricating oil of Claim 27.  
17
- 18 30. Lubricating oil comprising:  
19  
20 a major amount of one or more base oils;  
21  
22 about 1.25 wt. % to about 6 wt. % of one or more dispersants;  
23  
24 about 2 wt. % to about 6 wt. % of one or more detergents;  
25  
26 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors; and  
27  
28 about 0.04 wt. % to about 1.75 wt. % sulfurized isobutylene.  
29
- 30 31. A method of making the lubricating oil of Claim 30 comprising  
31 combining about 1.25 wt. % to about 6 wt. % one or more dispersants;  
32  
33 about 2 wt. % to about 6 wt. % of one or more detergents;

1

2 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors; and

3

4 about 0.04 wt. % to about 1.75 wt. % sulfurized isobutylene

5

6 in any order.

7

8 32. A method of lubricating engines comprising contacting the lubricating  
9 oil of Claim 30 with one or more engines.